

High protein intake improves insulin sensitivity but exacerbates bone resorption in immobility (WISE study)

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Inactivity, like bed rest (BR), causes insulin resistance (IR) and bone loss even in healthy subjects. High protein intake seems to mitigate this IR but might exacerbate bone loss. We hypothesized that high protein intake (animal:vegetable protein ratio: 60:40), isocaloric, compared to the control group plus high potassium intake would prevent IR without affecting bone turnover. After a 20-day ambulatory adaptation to controlled confinement and diet, 16 women participated in a 60-day, 6° head-down-tilt BR and were assigned randomly to one of the two groups. Control subjects (CON, n=8) received 1g/kg body mass/d dietary protein. Nutrition subjects (NUT, n=8) received 1.45g/kg body mass/d dietary protein plus 7.2g branched chain amino acids per day during BR. All subjects received 1670 kcal/d. Bed rest decreased glucose disposal by 35% ($p<0.05$) in CON. Isocaloric high protein intake prevented insulin resistance, but exacerbated bed rest induced increase in bone resorption markers C-telopeptide ($> 30\%$) and N-telopeptide ($>20\%$) (both: $p<0.001$). Bone formation markers were unaffected by high protein intake. We conclude from these results that high protein intake might positively affect glucose tolerance, but might also foster bone loss. Further long-duration studies are mandatory before high protein intake for diabetic patients, who have an increased fracture risk, might be recommended.